

In the claims

1-29. (Canceled)

30. (New) A biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, prepared by a process comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said polymer-polymer intercoupling reaction is conducted at a temperature in the range of 35-55 degrees Celsius.

31. (New) The material of claim 30, wherein said process further comprises washing said synthetic polymer B with water prior to reacting said synthetic polymer B with said natural water-soluble polymer A.

32. (New) A biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, prepared by a process comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said synthetic polymer B has been purified by washing with water.

33. (New) A biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, prepared by a process comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said polymer-polymer intercoupling reaction is carried out in water.

34. (New) The material of any one of claims 30-33, wherein the natural polymer is collagen, a collagenic biopolymer, gelatin, gelatin modified by reaction with an anhydride or acid

chloride, alfa-keratose, gama-keratose, keratin hydrolysate, elastin, fibrin, casein, or soybean protein.

35. (New) The material of any one of claims 30-33, wherein the natural polymer is a collagenic biopolymer, gelatin, or gelatin modified by reaction with an anhydride or acid chloride.
36. (New) The material of any one of claims 30-33, wherein the natural polymer is gelatin.
37. (New) A biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, prepared by a process comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said natural water-soluble polymer A is a protein modified by reaction with an anhydride or acid chloride.
38. (New) The material of claim 37, wherein said natural water-soluble polymer A is gelatin modified by reaction with an anhydride or acid chloride.
39. (New) The material of claim 37, wherein said natural water-soluble polymer A is gelatin modified by reaction with phthalic anhydride or benzoyl chloride.
40. (New) The material of claim 30, 31, 32, 33, or 37, wherein the natural polymer has at least 1 $\times 10^{-3}$ moles -COOH/g and at least 0.5 $\times 10^{-3}$ moles -NH₂/g, and said natural polymer has an isoelectric point of not less than 2.5 and not more than 10.5.
41. (New) The material of claim 30, 31, 32, 33, or 37, wherein said synthetic polymer B is a linear or branched reactive synthetic copolymer having a molecular weight of 50,000-500,000 Da derived from a vinyl monomer and an ethylenically unsaturated monomer, said copolymer having a backbone with polymeric subunits R_n and R_r, wherein R represents a subunit covalently bonded to the polymer backbone, n represents non-reactive chemical functional groups and r represents reactive chemical functional groups.
42. (New) The material of claim 41, wherein R_r is -CO-O-CO- or -CO-NH-CO-.
43. (New) The material of claim 41, wherein the reactive chemical functional group is maleic anhydride, itaconic anhydride, citraconic anhydride, or 2-octenylsuccinic anhydride.

44. (New) The material of claim 30, 31, 32, 33, or 37, wherein the synthetic polymer B is prepared from ethylene, propene, styrene, isobutylene, vinyl acetate, methyl acrylate, methyl methacrylate, acrylamide, vinylether, N-vinylpyrrolidone, acrylic acid, methacrylic acid, or maleic acid.
45. (New) The material of claim 30, 31, 32, 33, or 37, wherein the synthetic polymer B comprises poly (ethylene-alt-maleic anhydride), poly (ethylene-graft-maleic anhydride), poly (isobutylene-co-maleic anhydride), poly (isoprenegraft-maleic anhydride), poly (maleic anhydride-co-1-octadecene), poly (propylene-graft-maleic anhydride), or poly (styrene-co-maleic anhydride).
46. (New) The material of claim 30, 31, 32, 33, or 37, wherein the synthetic polymer B comprises poly (styrene-co-maleic anhydride).
47. (New) The material of claim 30, 31, 32, 33, or 37, wherein the ionic reactive chemical functionality of polymer B is not less than 5×10^{-3} moles "r"/g and not more than 1×10^{-2} moles "r"/g.
48. (New) The material of claim 30, 31, 32, 33, or 37, wherein said polymer-polymer intercoupling reaction is conducted in the presence of a base.
49. (New) The material of claim 48, wherein said base is NaOH, NH₃, or LiOH.
50. (New) A method for preparing a biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said polymer-polymer intercoupling reaction is conducted at a temperature in the range of 35-55 degrees Celsius.
51. (New) The method of claim 50, further comprising washing said synthetic polymer B with water prior to reacting said synthetic polymer B with said natural water-soluble polymer A.

52. (New) A method for preparing a biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said synthetic polymer B has been purified by washing with water.
53. (New) A method for preparing a biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said intercoupling reaction is carried out in water.
54. (New) The method of any one of claims 50-53 wherein the natural polymer is collagen, a collagogenic biopolymer, gelatin, gelatin modified by reaction with an anhydride or acid chloride, alfa-keratose, gama-keratose, keratin hydrolysate, elastin, fibrin, casein, or soybean protein.
55. (New) The method of claim 54, wherein the natural polymer is gelatin.
56. (New) A method for preparing a biocompatible, biodegradable, macromolecular water-absorbent hybrid material having a three-dimensional configuration with intermolecular covalent bonds and containing free functional groups selected from the group consisting of -OH, -SH, -NH₂ and -COOH, comprising reacting a natural water-soluble polymer A and a synthetic polymer B to form a water-absorbent hybrid material by a polymer-polymer intercoupling reaction, wherein said natural water-soluble polymer A is a protein modified by reaction with an anhydride or acid chloride.
57. (New) The method of claim 56, wherein said natural water-soluble polymer A is gelatin modified by reaction with phthalic anhydride or benzoyl chloride.

58. (New) The method of claim 50, 51, 52, 53, or 56, wherein the synthetic polymer B comprises prepared from poly (ethylene-alt-maleic anhydride), poly (ethylene-graft-maleic anhydride), poly (isobutylene-co-maleic anhydride), poly (isoprenegraft-maleic anhydride), poly (maleic anhydride-co-1-octadecene), poly (propylene-graft-maleic anhydride), or poly (styrene-co-maleic anhydride).
59. (New) The method of claim 50, 51, 52, 53, or 56, wherein the synthetic polymer B comprises poly (styrene-co-maleic anhydride).
60. (New) The method of claim 50, 51, 52, 53, or 56, wherein the natural polymer has at least 1×10^{-3} moles -COOH/g and at least 0.5×10^{-3} moles -NH₂/g, and said natural polymer has an isoelectric point of not less than 2.5 and not more than 10.5.
61. (New) The method of claim 50, 51, 52, 53, or 56, wherein the ionic reactive chemical functionality of polymer B is not less than 5×10^{-3} moles "r"/g and not more than 1×10^{-2} moles "r"/g.
62. (New) The method of claim 50, 51, 52, 53, or 56, wherein said polymer-polymer intercoupling reaction is conducted in the presence of a base.
63. (New) The method of claim 62, wherein said base is NaOH, NH₃, or LiOH.
64. (New) The material of claim 30, 31, 32, 33, or 37 for use in personal care products that absorb body fluids.
65. (New) The material of claim 30, 31, 32, 33, or 37 for use in baby diapers, incontinence products and feminine hygiene products.
66. (New) The material of claim 30, 31, 32, 33, or 37 for use in soil conditioning.
67. (New) The material of claim 30, 31, 32, 33, or 37 for use as drying agents of hydrophobic liquids such as petroleum products or fuels.
68. (New) The material of claim 30, 31, 32, 33, or 37 for use in medical biomaterials.
69. (New) A method of preparing a biocompatible, biodegradable, macromolecular water-absorbent hybrid material, having a three dimensional configuration with intermolecular

covalent bonds and containing free functional groups selected from OH, SH, NH₂, and COOH, comprising:

- a) adding an aqueous solution of a water soluble polymer to a water dispersion of a synthetic polymer under mixing conditions to form a mixture;
- b) mixing the mixture from step a) for about 10 to 40 minutes to form an intercoupled mixture;
- c) adding an aqueous solution of a base to the intercoupled mixture from step b) to obtain a reaction mass mixture;
- d) mixing the reaction mass mixture from step c) for about 1 to 12 hours; and
- e) separating and drying the reaction mass mixture.

70. (New) The process of claim 69, wherein the concentration of the aqueous solution of the water soluble polymer of step a) is from about 1% to 20% by weight.

71. (New) The process of claim 69, wherein the concentration of the aqueous solution of the water soluble polymer of step a) is from about 2% to 10% by weight.

72. (New) The process of claim 69, wherein the aqueous solution of the water soluble polymer is prepared by dissolving the water soluble polymer in water with a conductivity of less than 10 µS at about 55-65°C.

73. (New) The process of claim 69, wherein the concentration of the water dispersion of a synthetic polymer is from about 20% to 50% by weight.

74. (New) The process of claim 69, wherein the concentration of the water dispersion of a synthetic polymer is from about 30% to 40% by weight.

75. (New) The process of claim 69, wherein the water dispersion of a synthetic polymer is prepared by mixing the synthetic polymer in water having a conductivity less than 10µS in a blender from about 5 to 25 minutes at 1000 to 5000 rpm.

76. (New) The process of claim 69, wherein the water dispersion of a synthetic polymer is prepared by mixing the synthetic polymer in water having a conductivity less than 10µS in a blender from about 10 to 20 minutes at 2500 to 3500 rpm.

77. (New) The process of claim 69, wherein the concentration of water soluble polymer and synthetic polymer in the mixture from step a) is from 1% to 99% by weight.
78. (New) The process of claim 69, wherein the concentration of water soluble polymer and synthetic polymer in the mixture from step a) is from 5% to 35% by weight.
79. (New) The process of claim 69, wherein the mixture is mixed in step b) for about 15 to 25 minutes.
80. (New) The process of claim 69, wherein the mixture in step b) is mixed at about 15 to 75°C.
81. (New) The process of claim 69, wherein the mixture in step b) is mixed at about 35 to 55°C.
82. (New) The process of claim 69, wherein the base is selected from the group consisting of lithium hydroxide, sodium hydroxide, potassium hydroxide, ammonium hydroxide, lithium carbonate, lithium bicarbonate, sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate, ammonium bicarbonate, and mixtures thereof.
83. (New) The process of claim 69, wherein the amount of base added to the intercoupled mixture from step b) is from about 1% to 25% by weight of the water soluble polymer and synthetic polymer.
84. (New) The process of claim 69, wherein the amount of base added to the intercoupled mixture from step b) is from about 5% to 20% by weight of the water soluble polymer and synthetic polymer.
85. (New) The process of claim 69, wherein the reaction mass mixture is mixed in step d) from about 3 to 8 hours.
86. (New) The process of claim 69, wherein the reaction mass mixture is separated by screw extrusion.
87. (New) The process of claim 69, wherein the reaction mass mixture is dried by circulating air.
88. (New) The process of claim 69, wherein the reaction mass mixture is dried by circulating air at about 40 to 100°C.

89. (New) The process of claim 69, wherein the reaction mass mixture is dried by circulating air at about 50 to 90°C.
90. (New) The process of claim 69, wherein the reaction mass mixture is dried to a moisture content of about 3% to 15% by weight.
91. (New) The process of claim 69, wherein the reaction mass mixture is dried to a moisture content of about 7% to 12% by weight.
92. (New) The process of claim 69, further comprising the step of storing the dried reaction mass mixture from step e) for about 24 to 96 hours at about 20 to 30°C.
93. (New) The process of claim 69, further comprising the step of storing the dried reaction mass mixture from step e) for about 48 to 72 hours at about 20 to 30°C.